

## Autonomous Control of Space Nuclear Reactors, Phase I

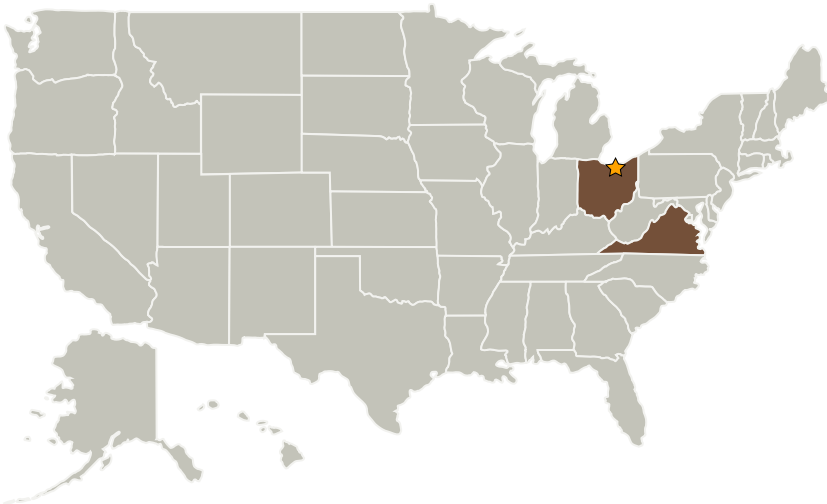
Completed Technology Project (2008 - 2008)



## Project Introduction

Nuclear reactors to support future lunar and Mars robotic and manned missions impose new and innovative technological requirements for their control and protection instrumentation. Long duration surface missions necessitate reliable autonomous operation, and manned missions impose the added requirement of fail-safe reactor protection systems. There is a need to define an advanced instrumentation and control system for space-nuclear reactors that addresses both aspects of autonomous operation and safety. The constraints and conditions imposed on instrumentation for earth-based reactors are stringent enough to provide an excellent reference for a similar space-based system. However, these systems are typically analog-digital hybrids, and are not optimized for mass, volume, or power consumption. As a result, there is currently no earth-based reactor control system that is practical for use in space. We propose to develop a comprehensive reactor instrumentation and control system based on proven technology used at nuclear research facilities, for operation in the space environment and in particular for nuclear surface power facilities. The heritage established by these terrestrial 'reference' reactors through years of flawless operation on earth make them ideal candidates on which to base a compact, fully-digital space instrument for the control and protection of nuclear surface power systems.

## Primary U.S. Work Locations and Key Partners



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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Glenn Research Center (GRC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Aurora Flight Sciences Corporation	Supporting Organization	Industry	Cambridge, Massachusetts

## Primary U.S. Work Locations

Ohio	Virginia
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## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

**Principal Investigator:**

John F Merk

## Technology Areas

**Primary:**

- TX14 Thermal Management Systems
  - └ TX14.2 Thermal Control Components and Systems
    - └ TX14.2.3 Heat Rejection and Storage